

## 2 - 5 Technology Transfer

One of the objectives of the project is to pursue technology transfer of digital topographic mapping so that the BiH agencies concerned with mapping can revise the 1:25,000 topographic maps in the future. It can be pointed out that the transferred technology would be useful not only for 1:25,000 but also for other scale mappings and various purposes else.

### 2 - 5 - 1 Programs

Topographic mapping was carried out through principal seven processes. They are control point survey and signalization of control points, aerial photography, photo interpretation and field identification, aerial triangulation and digital plotting, digital map symbolization, field completion, and GIS data creation. Aerial photography was performed by a sub - contractor. The other six processes were performed by the Team and the BiH counterparts.

For these processes except aerial photography, technology transfer sessions were prepared. Control point survey and signalization of control point, photo - interpretation and field identification, and field completion were conducted through OJT. Aerial triangulation and digital plotting was conducted in Japan from February to March 2004 and in BiH during the third phase from May to June 2004. Training sessions for digital map symbolization were conducted in BiH in the third phase from May to June 2004 and in Japan from October to November 2004. The GIS data creation training sessions were conducted in BiH in the third phase from May to June 2004 and in Japan from October to November 2004. The systems for technology transfer were installed in two locations; Figure 2 - 12 shows the system installed. The specifications on the system are included in Volume II - 4. All the session are shown in Table 2 - 4. A total of 34 counterparts took the sessions. They are listed in Table 2 - 5.

**Table 2 - 4 Technology Transfer Sessions**

Subject	Place	Period	Instructor
Control Point Survey and Signalization of Control Point	BiH	April 2003 - June 2003	Mr. Yutaka Nakada
Photo - interpretation and Field Identification	BiH	July 2003 - August 2003	Mr. Sadao Matsumoto
		September 2003 - November 2003	Mr. Sadao Matsumoto
Aerial Triangulation and Digital Plotting	Sarajevo	May 2004 - June 2004	Mr. Minoru Onaka
		September 2005	Mr. Nobuhiro Sata
	Bijeljina	May 2004 - June 2004	Mr. Minoru Onaka
	Japan	February 2004 - March 2004	Mr. Hidetoshi Kakiuchi and Mr. Mitsuhiro Asai
Digital Map Symbolization	Sarajevo	May 2004 - June 2004	Mr. Toshinori Otsu
		September 2005	Mr. Takashi Shimono
	Bijeljina	May 2004 - June 2004	Mr. Takashi Shimono
	Japan	October 2004 - November 2004	Mr. Toshinori Otsu
Field Completion	BiH	September 2004 - October 2004	Mr. Sadao Matsumoto
GIS Data Creation	Sarajevo	June 2004	Mr. Hidetoshi Kakiuchi
	Bijeljina	May 2004 - June 2004	Mr. Hidetoshi Kakiuchi
	Japan	October 2004 - November 2004	Mr. Hidetoshi Kakiuchi

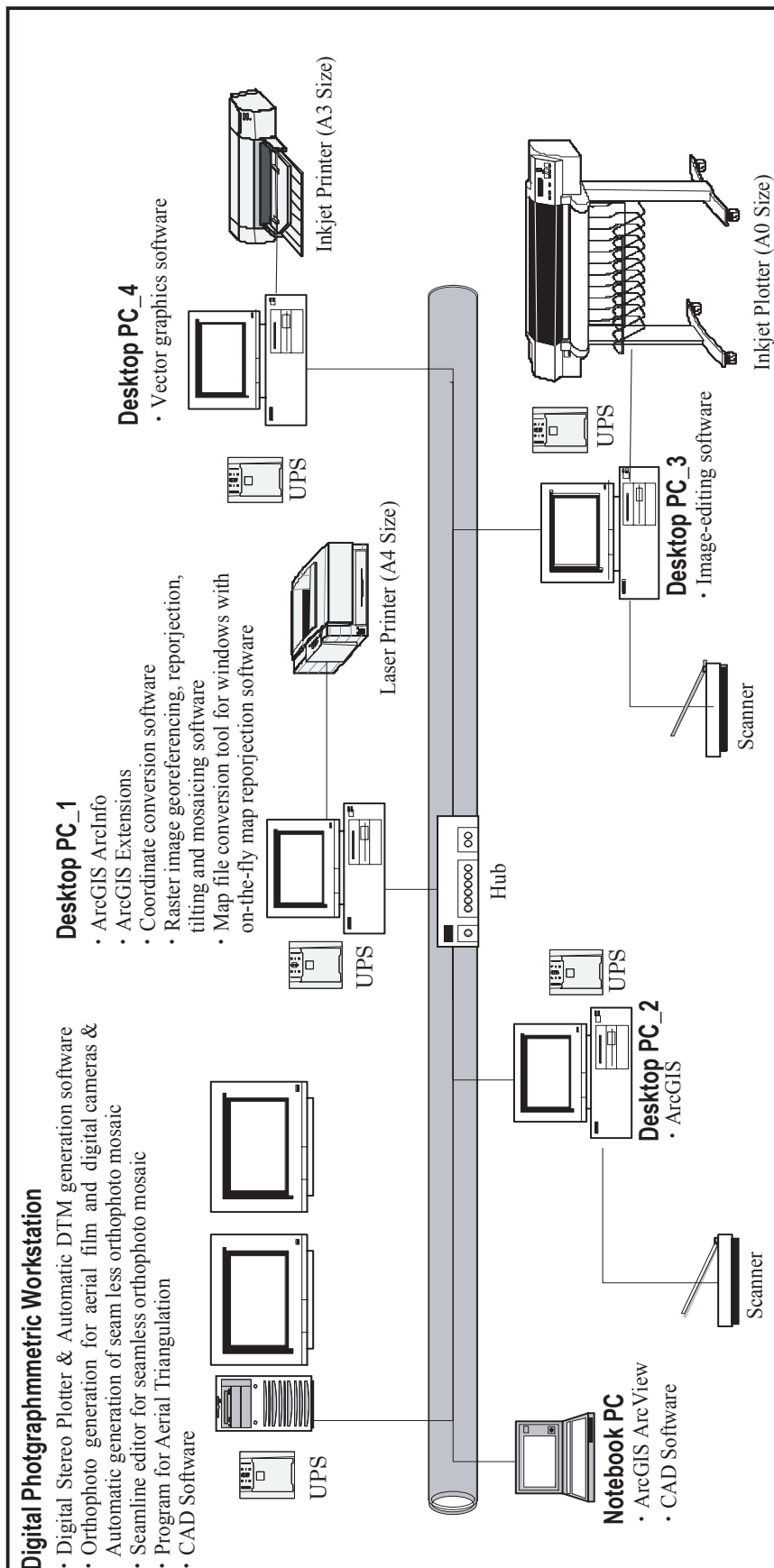


Figure 2 - 12 System Diagram

**Table 2 - 5 List of Trainees**

<b>Control Point Survey and Signalization of Control Point (BiH)</b>	
Ms. Amira Kadic	JP Geodetski Zavod BiH
Ms. Zonja Hodzic	ditto
Mr. Uzeir Tucovic	ditto
Mr. Zoran Kalem	Republic Administration for Geodetic and Real Property Affairs
Mr. Esad Vrce	City of Mostar
Mr. Smilian Micanovic	Faculty of Civil Engineering, University of Sarajevo
Mr. Admir Mulahusic	ditto
Ms. Medzida Mulic	ditto
Ms. Dzanina Omicevic	ditto
<b>Photo - interpretation and Field Identification (BiH)</b>	
Mr. Enver Halilic	JP Geodetski Zavod BiH
Mr. Hamid Jelacic	ditto
Ms. Hasija Dzafic	ditto
Ms. Sabina Habibovic	ditto
Ms. Sabira Habibovic	ditto
Ms. Sija Hambo	ditto
Mr. Nikola Cerovina	Republic Administration for geodetic and Real Property Affairs
Ms. Natasa Ilic	ditto
Ms. Zorica Jokanovic	ditto
Mr. Dragan Lazarevic	ditto
Mr. Velibor Vitor	ditto
<b>Aerial Triangulation and Digital Plotting (Sarajevo)</b>	
Mr. Nedim Darman	JP Geodetski Zavod BiH
Ms. Hasija Dzafic	ditto
Mr. Suljo Dzamaliija	ditto
Ms. Remza Hamzic	ditto
Ms. Vahida Kljuno	ditto
Ms. Senada Kutlovac	ditto
Ms. Muvedeta Rapa	ditto
Mr. Darko Raspudic	Urbing Public Enterprise for Construction and Reconstruction, City of Mostar
Mr. Admir Mulahusic	Faculty of Civil Engineering, University of Sarajevo
<b>Aerial Triangulation and Digital Plotting (Bijeljina)</b>	
Mr. Dragan Lazarevic	Republic Administration for geodetic and Real Property Affairs
Mr. Darko Miskovic	ditto
Mr. Velibor Vitor	ditto
<b>Aerial Triangulation and Digital Plotting (Japan)</b>	
Mr. Admir Mulahusic	Faculty of Civil Engineering, University of Sarajevo
Mr. Darko Miskovic	Republic Administration for geodetic and Real Property Affairs
Mr. Stanko Tomic	Public Records Department of Brcko District of BiH
Mr. Darko Raspudic	Urbing Public Enterprise for Construction and Reconstruction, City of Mostar
<b>Digital Map Symbolization (Sarajevo)</b>	
Ms. Hasumana Abaza	Federal Administration for Geodetic and Real Property Affairs
Ms. Senada Kutlovac	JP Geodetski Zavod BiH
Ms. Indira Rapa	ditto
<b>Digital Map Symbolization (Bijeljina)</b>	
Mr. Zoran Kalem	Republic Administration for geodetic and Real Property Affairs
Mr. Darko Pantic	ditto
Mr. Vajo Racanovic	ditto
Ms. Jela Peric	Public Records Department of Brcko District of BiH
<b>Digital Map Symbolization (Japan)</b>	
Ms. Hasumana Abaza	Federal Administration for Geodetic and Real Property Affairs
Mr. Zoran Kalem	Republic Administration for geodetic and Real Property Affairs
<b>Field Completion (BiH)</b>	

Mr. Hamid Jelacic	JP Geodetski Zavod BiH
Ms. Sabira Habibovic	ditto
Ms. Vahida Kljuno	ditto
Ms. Indira Rapa	ditto
Mr. Nikola Cerovina	Republic Administration for geodetic and Real Property Affairs
Ms. Natasa Ilic	ditto
Ms. Zorica Jokanovic	ditto
Mr. Zoran Kalem	ditto
Mr. Dragan Lazarevic	ditto
Mr. Velibor Vitor	ditto
<b>GIS Data Creation (Sarajevo)</b>	
Ms. Hasumana Abaza	Federal Administration for Geodetic and Real Property Affairs
Ms. Amira Kadic	JP Geodetski Zavod BiH
Mr. Uzeir Tucovic	ditto
Ms. Dzanina Omicevic	Faculty of Civil Engineering, University of Sarajevo
Mr. Nedim Tuno	ditto
<b>GIS Data Creation (Bijeljina)</b>	
Mr. Milorad Despotovic	Republic Administration for geodetic and Real Property Affairs
Ms. Natasa Ilic	ditto
Mr. Darko Miskovic	ditto
Mr. Velibor Vitor	ditto
<b>GIS Data Creation (Japan)</b>	
Ms. Amira Kadic	JP Geodetski Zavod BiH
Mr. Velibor Vitor	Republic Administration for geodetic and Real Property Affairs

## 2 - 5 - 2 Training Sessions

### (1) Control Point Survey and Signalization of Control Point

The BiH counterparts under the supervision of the Team conducted control point surveys with GPS and signalization of control points for the new mapping areas. For the areas of the Principal 21 Cities the works were conducted from the end of March to June 21, 2003, and for the Eco - tourism Study areas from September to October 2003. Several of the installed aerial signals were damaged before photographing because of the delay of aerial photography. The counterpart needed to repair signals.

### (2) Aerial Photography

As for aerial photographing process, a subcontractor under the supervision of the Team took photos and delivered to the Team in the first phase 2003. It is foreseen that the BiH agencies concerned with mapping will not perform photo taking in the future, but they should be able to check the quality of photos. So, during the photographing process the Team gave an instruction on how to check the photos with rush prints sent from laboratory. The manual presented to the counterparts is compiled in Volume III - 1.



**Photo 2 - 3 GPS Operation Training 1**



**Photo 2 - 4 GPS Operation Training 2**



**Photo 2 - 5 New Control Point Establishment 1**



**Photo 2 - 6 GPS Observation**



**Photo 2 - 7 New Control Point Establishment 2**



**Photo 2 - 8 Signalization of Control Point**



Photo 2 - 9 Signalization of Control Points



Photo 2 - 10 Reference Aerial Signal

### (3) Photo Interpretation and Field Identification

Training for photo - interpretation and field identification was conducted through OJT during the field identification works in BiH from June to October 2003. The results of their works were practical for the succeeding processes of digital plotting and map symbolization. The manual presented to the counterparts is compiled in Volume III - 2.



Photo 2 - 11 Photo Interpretation 1



Photo 2 - 12 Photo Interpretation 2



Photo 2 - 13 Photo Interpretation 3



Photo 2 - 14 Photo Interpretation 4



Photo 2 - 15 Filed Identification 1



Photo 2 - 16 Field Identification 2

#### (4) Aerial Triangulation and Digital Plotting in Japan

The training of aerial triangulation and digital plotting in Japan was carried out to understand basic concept and operation using the Softcopy Exploitation Tool Set (SOCET SET) and PAT - B software. Main subjects of the training were Create Project, Frame Import, Interior Orientation, Ground Point Import, Triangulation and Feature Extraction. Teaching materials were 12 aerial photos of three courses and three control points in an area of the map sheet of Zvornik 095\_1\_1. See Table 2 - 6 and Figure 2 - 13.

Table 2 - 6 Aerial Photos Used

Course No.	Direction	Number of Photos	Photo No.			
14	→	4	2724	2725	2726	2727
15	→	4	2800	2801	2802	2803
16	←	4	2811	2810	2809	2808

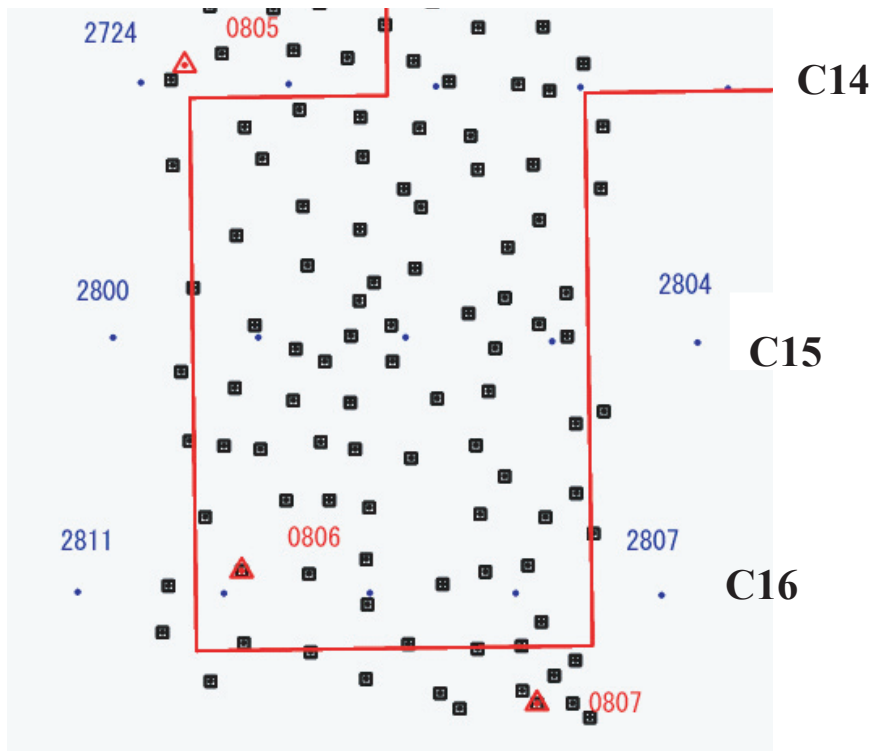


Figure 2 - 13 Target Area

Actual description forms of aerial photo signal points were used to master how to measure the control points. See Figure 2 - 14. Two programs, namely MST (Multi - Sensor Triangulation) and BAT - B were used for adjustment calculation of triangulation to learn that several programs exist.

The objectives of the digital plotting training were to understand basic operation and to lean feeling of the ground touch on the 3d model. Main plotting objects were roads, buildings, rivers, ridgelines, contour line, etc.

This training in Japan was just introduction of the aerial triangulation and digital plotting and more developed training was carried out in BiH later.



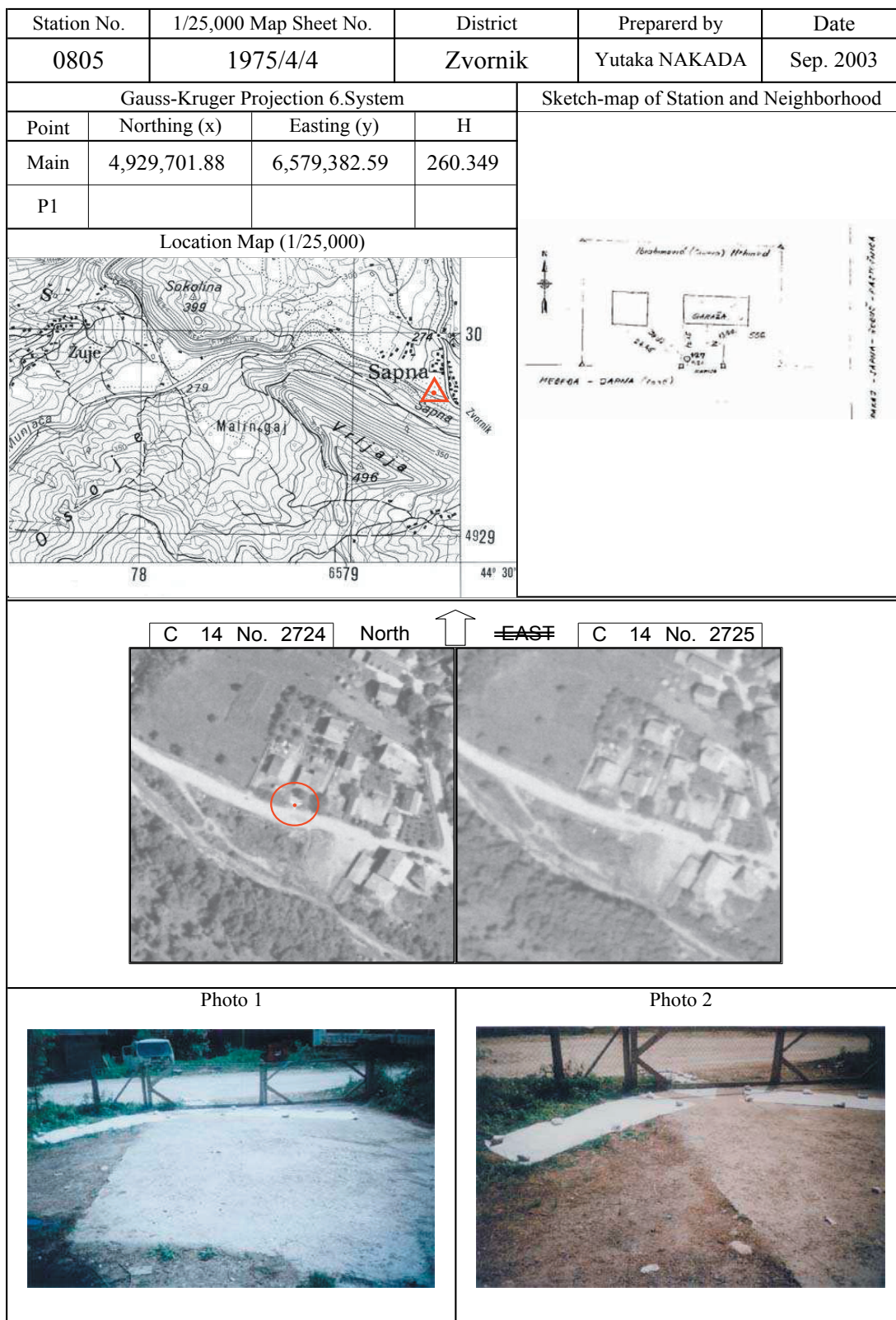


Figure 2 - 14 Description of Signalization of Control Point